

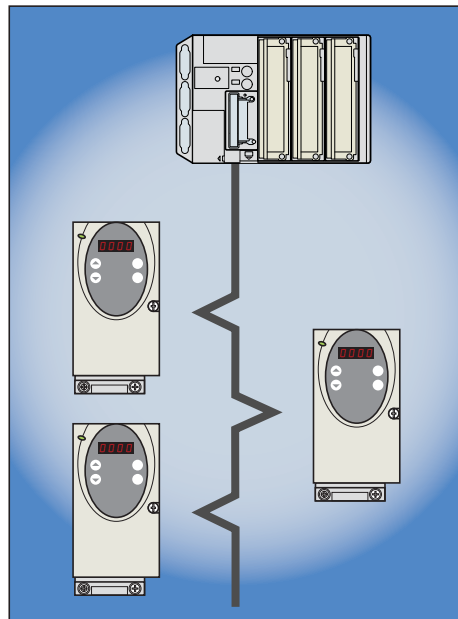
# Altivar 21

User manual

Retain for future use

LONWORKS® card

VW3 A21 312





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**NOTE**

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The products described in this document may be changed or modified at any time, either from a technical point of view or in the way they are operated. Their description can in no way be considered contractual.

# 1. Important Information

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## NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personnel injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

## DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death, serious injury, or equipment damage.

## WARNING

Warning indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.

## CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

## PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.  
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## 2. Before you begin

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**Read and understand these instructions before performing any procedure with this drive, in order to completely and correctly utilize excellent performance of this unit.**

Besides this user manual, you will find in the chapter "Documentation structure" which manuals we advice you to read to develop software communicating with Altivar 21.

If you need support, please contact our sales offices.

After reading this instruction manual, please keep it handy for future reference

**Read and understand these instructions before performing any procedure with this drive.**

### **DANGER**

#### **HAZARDOUS VOLTAGE**

- Read and understand the Installation Manual before installing or operating the Altivar 21 drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical standards in force concerning protective grounding of all equipment.
- Many parts of this variable speed drive, including the printed circuit cards, operate at the line voltage. **DO NOT TOUCH.** Use only electrically insulated tools.
- **DO NOT** touch unshielded components or terminal strip screw connections with voltage present.
- **DO NOT** short across terminals PA and PC or across the DC bus capacitors.
- Install and close all the covers before applying power or starting and stopping the drive.
- Before servicing the variable speed drive
  - Disconnect all power.
  - Place a "DO NOT TURN ON" label on the variable speed drive disconnect.
  - Lock the disconnect in the open position.
- Disconnect all power including external control power that may be present before servicing the drive. **WAIT 15 MINUTES** to allow the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure given in the Installation Manual to verify that the DC voltage is less than 45 VDC. The drive LEDs are not accurate indicators of the absence of DC bus voltage.

**Electric shock will result in death or serious injury.**

### **CAUTION**

#### **DAMAGED EQUIPMENT**

Do not install or operate any drive that appears damaged.

Failure to follow this instruction can result in injury or equipment damage.

### 3. Introduction

---

Thank you for purchasing the LONWORKS® option card (VW3A21312) for Altivar 21 drive.

By installing this card into the Altivar 21, data communication can be made with a host computer or other device via LONWORKS® network.

The communication card has an open-style 3-pin connector for connection to the network. It supports free topology at 78 kbit/s.

Data exchanges give access to all Altivar 21 functions:

- Control (start, stop, reset, setpoint),
- Monitoring (status, current, voltage, thermal state...),
- Diagnostics (alarms).

The LONWORKS® resource files (.XIF...) that provide the network configuration tools (LonMaker...) with device information are available on the Web site [www.telemecanique.com](http://www.telemecanique.com) and on the CDROM delivered with each drive.

The plug-in software tool that provides easy access to setting-up, testing and monitoring the ATV21 drive is also available on the Web site [www.telemecanique.com](http://www.telemecanique.com) and on the CDROM delivered with each drive.

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## 4. Documentation structure

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### ■ LONWORKS® ATV21 manual

The present LONWORKS® user manual describes:

- connection to LonWorks® network,
- configuration of the communication-specific parameters via the HMI,
- diagnostics,
- networks variables.

You will also find important information in other Altivar 21 technical documents. They are available on the Web site [www.telemecanique.com](http://www.telemecanique.com) and on the CDROM delivered with each drive:

### ■ ATV21 user manual

This manual describes:

- How to assemble the drive,
- How to connect the drive,
- The functions and the parameters of the drive,
- How to use the drive HMI.

If you use the Parameter access function of (nviParamCmd, nvoParamResp), will find in this manual the address and possible values of the parameters of the drive.

### ■ Modbus ATV21 manual

This manual describes:

- Connection to the bus or network,
- Configuration of the communication-specific parameters,
- Diagnostics,
- Software setup,
- Modbus services supported.

If you use the Parameter access function of (nviParamCmd, nvoParamResp), will find in this manual the address and possible values of additional parameters not described in ATV21 user manual.

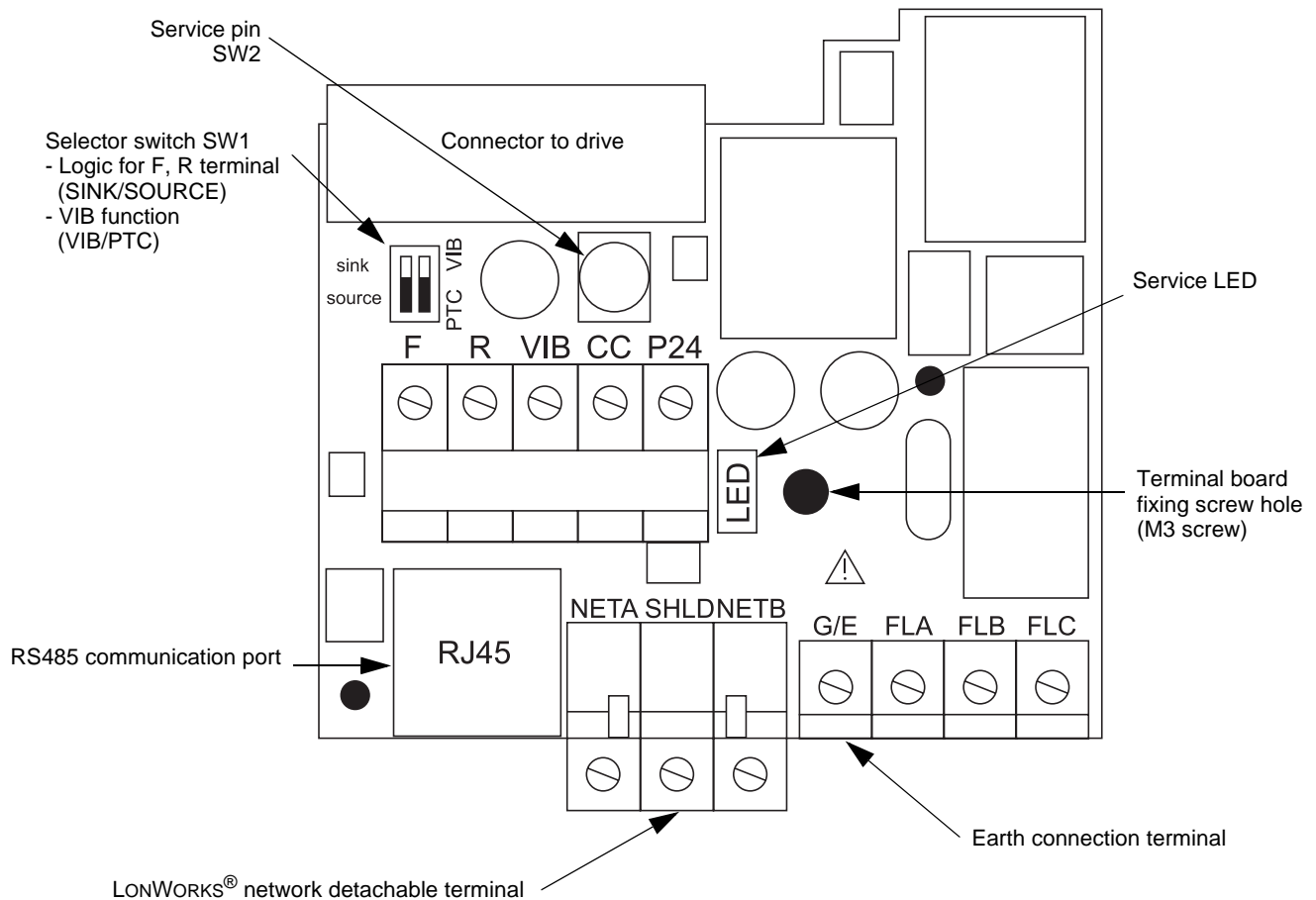


## 5. Hardware setup

### 5. 1. Receipt

- Check that the card reference printed on the label is the same as that on the delivery note corresponding to the purchase order.
- Remove the option card from its packaging and check that it has not been damaged in transit.
- The LONWORKS® card is shipped together with the following accessories. On opening the packing case, check to see if the following accessories are contained or not.
  - 1 cabling label and 2 name plates (1 sheet),
  - 1 insulating sheet,
  - 3 neuron ID labels (barcode EAN128).

### 5. 2. Hardware description



## ⚠ DANGER

- Operate service pin only when a cover for the main circuit terminal is attached. Otherwise, it could lead to electric shocks.
- Operate service pin using a non-conductive stick. When it is operated with a conductive stick, it could lead to electric shock

### 5. 3. Use of RS485 communication port

Serial communication (2-wire RS485) option can be used for Modbus, PC software or remote keypad.

One internal communication line is available either for the RS485 communication port or for the LONWORKS® port. So, while RS485 communication is used (connected to the appropriate cable or interface) the LONWORKS® port is disabled.

## 5. Hardware setup

### 5. 4. Description of terminals

Terminal symbol	Function	Electrical specifications	Internal circuits
NETA	LONWORKS® transmission data / reception data.	No polarity.	
NETB			
SHLD	LONWORKS® communication shield terminal.	This terminal is not connected to any other circuit of the card. Ground this terminal in a location separated from the ground of power line.	
G/E	Grounding terminal	Please connect to network ground.	
F	Multifunctional programmable logic input. It has forward rotation function in default setting. ON: forward rotation drive OFF: slowdown and stop	No voltage contact input 24VDC, 5mA or less.	
R	Multifunctional programmable contact input. It has reverse rotation function in default setting. ON: reverse rotation drive OFF: slowdown and stop	SINK/SOURCE can be selected with SW1.	
VIB	Multifunction programmable analog input. It has speed set point function in the default setting. (0 to 60Hz frequency with 0 to 10VDC input). In addition, this terminal can be used as PTC input by setting the parameters ( <b>F645</b> and <b>F646</b> ) and SW1.	10VDC  Internal impedance: 30kohm	
CC	Control circuit equipotential terminal	-	-
P24	24 VDC power supply output	24VDC-50mA	
FLA FLB FLC	Multifunctional programmable relay contact outputs. Default setting is set to detect the activation of the inverter protection function. Contact across FLA-FLC is closed and FLB-FLC is opened during protection function operation.	30VDC-0.5A 250VAC-1A (cos φ = 1) 250VAC-0.5A (cos φ = 0.4)	

## ⚠ DANGER

Do not change switch settings while power is on.

It may damage the product or lead to electric shocks and breakdown.

When setting the VIB function, set the parameter after configuring removed motor cables. The motor may suddenly start and that could result in injury.

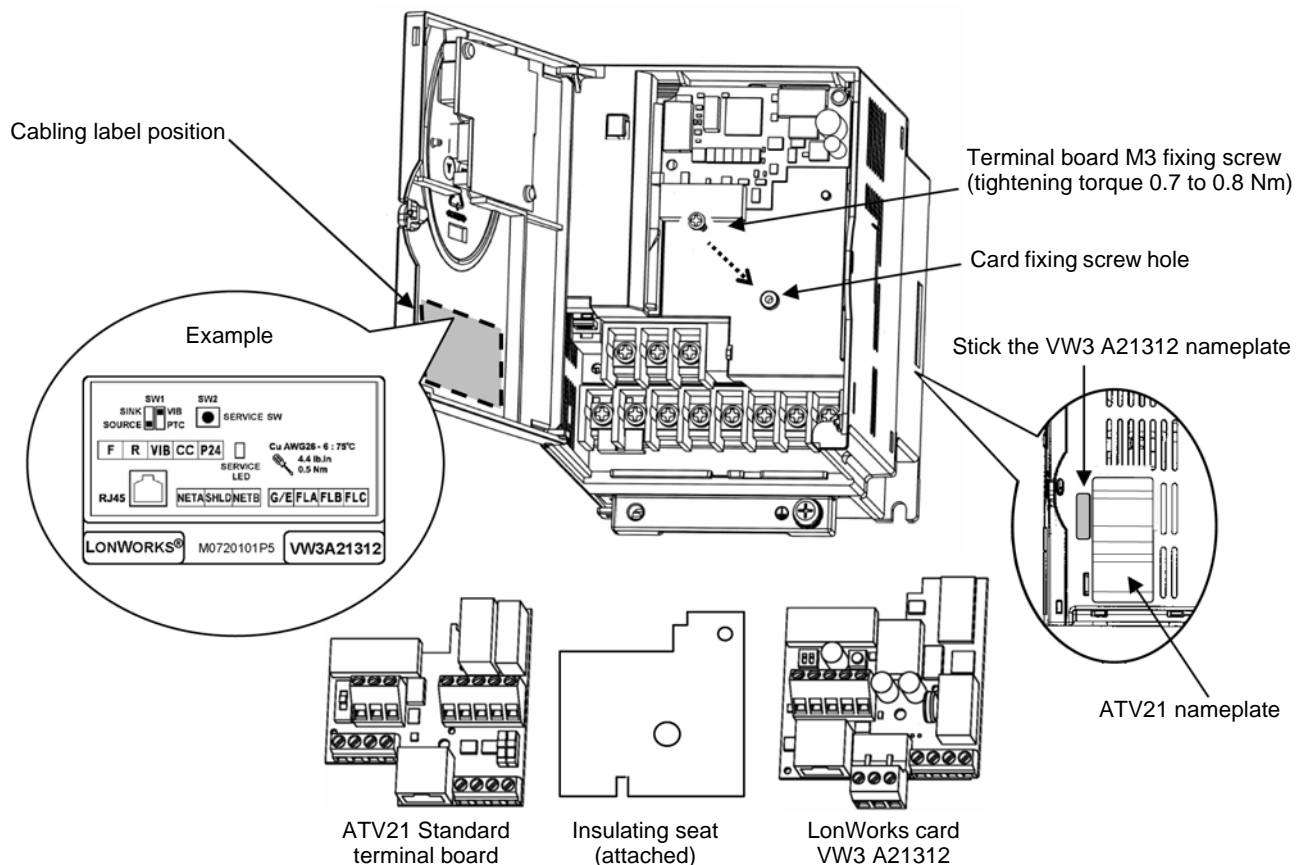
## 5. Hardware setup

### 5. 5. Installing the card in the drive

Install the LONWORKS® card in ATV21 as follows.

- 1 Turn off the input power of ATV21 and wait for at least 10 minutes and then check that the CHARGE lamp on ATV21 is no longer lit.
- 2 Open the ATV21 front cover, remove the terminal board fixing screw and take off the ATV21 standard terminal board.  
(Be careful not to lose the terminal board fixing screw when removed since it may be used again.)
- 3 Perform wiring an inverter before installing LONWORKS® card.
- 4 Please attach the insulating sheet in ATV21. (Fix to the terminal board fixing screw hole and ATV21 catch pin.)
- 5 Install the LONWORKS® card over the insulating sheet and secure it with the board fixing screw (M3 tapping screw tightening torque: 0.7 to 0.8Nm).
- 6 Stick the cabling label for LONWORKS® card on the standard cabling label stuck on the reverse side of the ATV21 front cover. And stick the LONWORKS® card nameplate near the standard nameplate. (Be careful not to cover slits on the ATV21 enclosure.)

Note: To install or remove the terminal board, make it slide in or out in parallel with board.



## 6. Connecting to the bus

### 6. 1. Topology

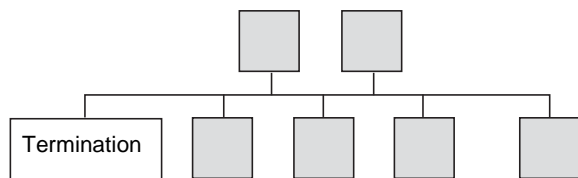
The LONWORKS® card supports free topology wiring and operates as well with bus, loop or star topologies:

#### Free topology system

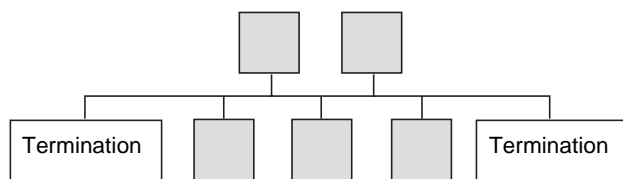
Free topology has many advantages:

- 1 The installer is free to select the method of wiring that best suits the installation, reducing the need for advanced planning and allowing last minute changes at the installation site.
- 2 If installers have been trained to use one style of wiring for all installations, free topology technology can be introduced without requiring retraining.
- 3 Retrofit installations with existing wiring plants can be accommodated with minimal, if any rewiring.

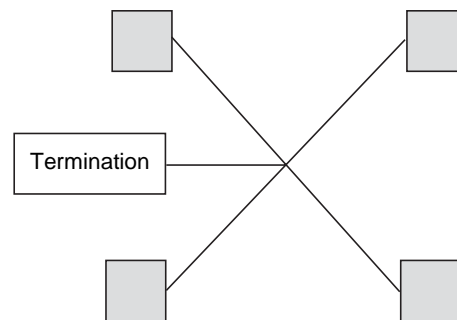
#### Typical wiring topologies



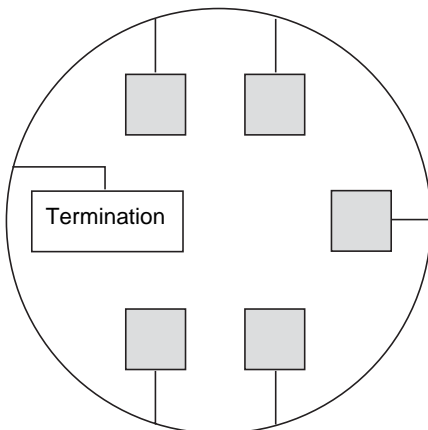
Singly terminated bus topology



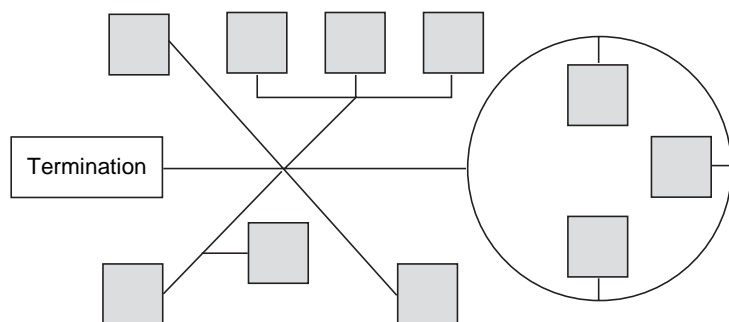
Doubly terminated bus topology



Star topology



Loop topology



Mixed topology

## 6. Connecting to the bus

### 6. 2. Cable routing practices

When wiring Altivar 21 drives to a LONWORKS® network, follow all wiring practices required by national and local electrical codes. Also observe the following guidelines:

- Avoid areas of high temperature, moisture, vibration, or other mechanical stress.
- Secure the cable where necessary to prevent its weight and the weight of other cables from pulling or twisting the cable.
- Use cable ducts, raceways, or other structures to protect the cable. Use these structures for signal wiring paths. They must not contain power wiring.
- Avoid sources of electrical interference that can induce noise into the cable. Use the maximum practicable separation from such sources.

When planning cable routing within a building, follow these guidelines:

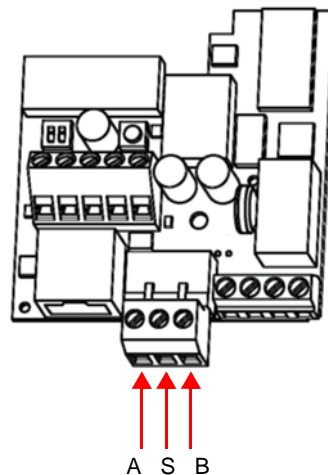
- Maintain a minimum separation of 1 m from the following equipment:
  - air conditioners and large blowers,
  - elevators and escalators,
  - radios and televisions,
  - intercom and security systems,
  - fluorescent, incandescent, and neon lighting fixtures.
- Maintain a minimum separation of 3 m from the following equipment:
  - line and motor power wiring,
  - transformers,
  - generators,
  - alternators.

When wiring in electrical equipment rooms or large electrical equipment line-ups, observe the following guidelines for cable segregation and separation of circuits:

- Use metallic conduit for drive wiring. Do not run control network and power wiring in the same conduit.
- Separate non-metallic conduits or cable trays used to carry power wiring from metallic conduit carrying low-level control network wiring by at least 300 mm.
- Separate metallic conduits carrying power wiring or low-level control network wiring by at least 80 mm.
- Cross the metallic conduits and non-metallic conduits at right angles whenever power and control network wiring cross.
- Attenuate conducted emissions from the drive to the line in some installations to prevent interference with telecommunication, radio, and sensitive electronic equipment. Such instances may require attenuating filters. Consult the Altivar catalog for selection and application of these filters.

### 6. 3. Wiring the LONWORKS® connector

The figure and the table below show the pin-outs of the card connectors. The removable LONWORKS® female connector attaches to the network cable.



Pin	Name
A	Net A
S	Shield
B	Net B

- Cable sheath should be peeled off by about 10 mm.
- For wiring work, use a fat blade screwdriver with a 0.6 mm thick and 3.5 mm width blade.
- Tightening torque for the terminal block is 0.5 to 0.6 Nm.

## 7. Configuration

### 7. 1. Drive parameters overridden by the LONWORKS® network

The LONWORKS® card will automatically override edit some of the inverter parameters below so that they should not be edited from the drive display:

Maximum frequency **FH**

Upper limit frequency **UL**

Lower limit frequency **LL**

Acceleration time 1 **ACC**

Deceleration time 1 **DEC**

Base frequency 1 **UL**

### 7. 2. Configuration of the internal communication

Set up the inverter parameters as follows. To update, reset the power of inverter. If these parameters are set to incorrect value, the LONWORKS® card cannot work normally.

Parameter	Function	Description
<b>F800</b>	Communication speed	Set 1 (19200bps), default value.
<b>F801</b>	Parity	Set 1 (even), default value.
<b>F803</b>	Communication error trip time	Set communication time out period.
<b>F829</b>	Communication protocol	Set 1 (MODBUS-RTU)
<b>F851</b>	Behaviour at communication fault	Select the inverter action after communication fault. Refer to "7. 4. "Configuration of the LONWORKS® fault", page 18.

## WARNING

Set up Communication fault function **F803**, (see the ATV21 user manual for details) to stop the inverter when this option card is deactivated by an unusual event such as tripping, an operating error, power outage, failure, etc. Deactivated option card may cause an accident, if the "Communication fault function" is not properly set up.

## 7. Configuration

### 7. 3. Configuration of the control

The ATV21 can receive commands and speed setpoint from the LONWORKS® network or from the terminals (F, R, VIB).

In the default configuration both commands and setpoint comes from the LONWORKS® network.

The LOC/REM key of the drive HMI is always available to switch the control to the HMI.

Input R can be configured to switch the control from the LONWORKS® network to the terminals.

Different possibilities are described below.

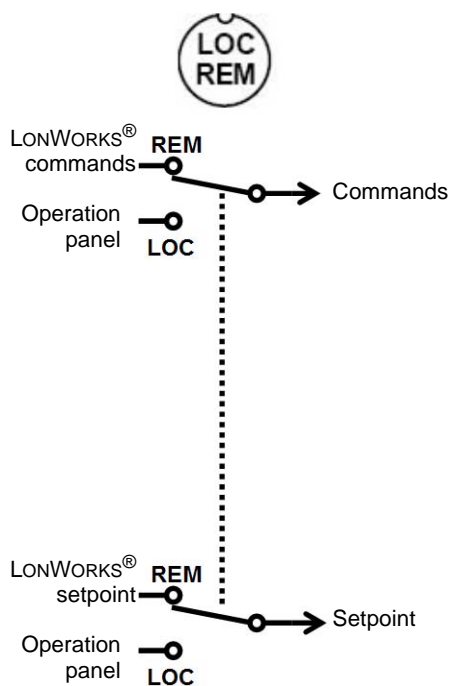
#### ■ Control by the LONWORKS® network

Commands and setpoint come from the LONWORKS® network.

The signals wired on the terminals are ignored.

The LOC/REM key is active.

This is default configuration.



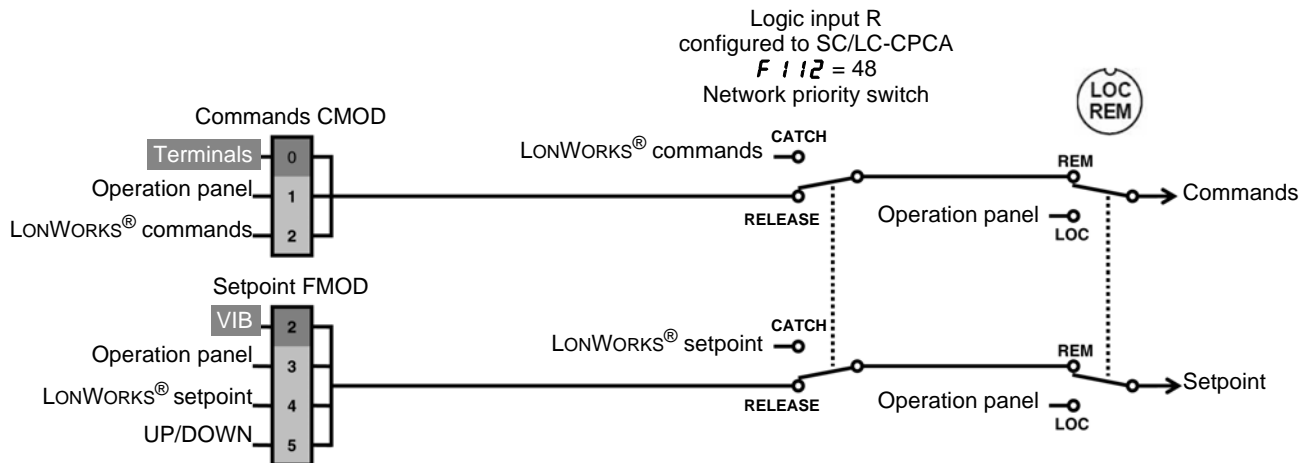
## 7. Configuration

### ■ Control by terminals, monitoring by the LONWORKS® network

Commands and setpoint come from the terminals.  
The drive is monitored by the LONWORKS® network.  
The LOC/REM key is active.

The function SC/LC or CPCA is assignment of logic input R (F112 = 48).  
The logic input R is ON (connected to P24 or CC depending on SINK/SOURCE selection).

Parameter	Function	Description
<b>CMOD</b>	0	Terminals
<b>FMOD</b>	2	VIB
<b>F112</b>	48	Logic input R configured to "Forced switching from remote to local control" (SC/LC or CPCA)

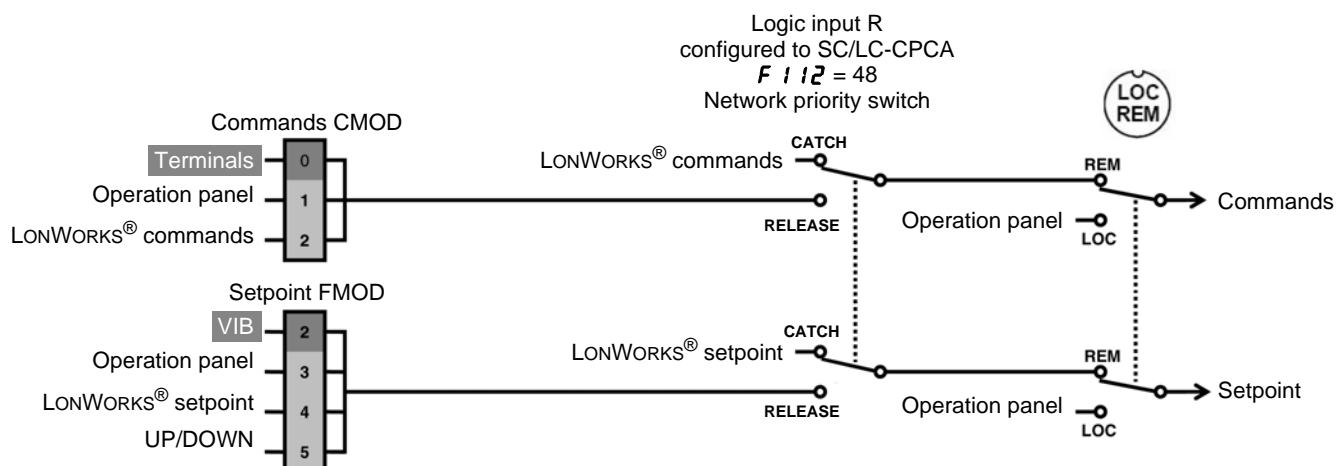


### ■ Control by the LONWORKS® network, switching to terminals by logic input

Commands and setpoint come from the LONWORKS® network if logic input R is OFF.  
Commands and setpoint come from the terminals if logic input R is ON.  
The LOC/REM key is active.

The function SC/LC or CPCA is assignment of logic input R (F112 = 48).

Parameter	Function	Description
CMOD	0	Terminals
FMOD	2	VIB
F112	48	Logic input R configured to "Forced switching from remote to local control" (SC/LC or CPCA)





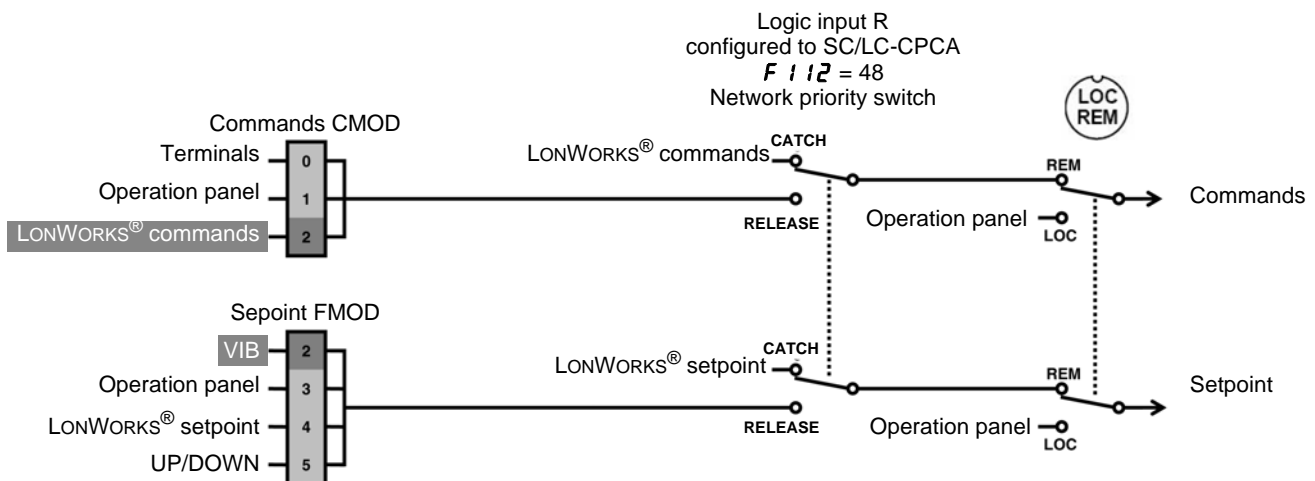
## 7. Configuration

### ■ Control by the LONWORKS® network, switching setpoint to terminals by logic input

Commands always come from the LONWORKS® network.  
Setpoint comes from the LONWORKS® network if logic input R is OFF.  
Setpoint comes from the terminals if logic input R is ON.  
The LOC/REM key is active.

The function SC/LC or CPCA is assignment of logic input R (F112 = 48).

Parameter	Function	Description
<b>CNOd</b>	2	LONWORKS® network
<b>FNOd</b>	2	VIB
<b>F112</b>	48	Logic input R configured to "Forced switching from remote to local control" (SC/LC or CPCA)

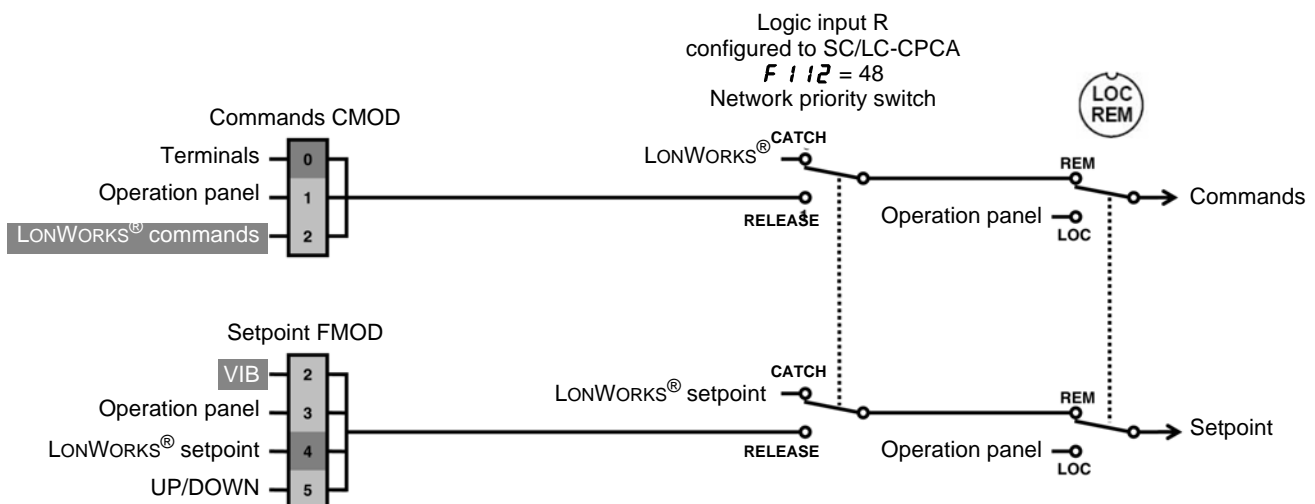


### ■ Setpoint by the LONWORKS® network, switching commands to terminals by logic input

Setpoint always comes from the LONWORKS® network.  
Commands come from the LONWORKS® network if logic input R is OFF.  
Commands come from the terminals if logic input R is ON.  
The LOC/REM key is active.

The function SC/LC or CPCA is assignment of logic input R (F112 = 48).

Parameter	Function	Description
<b>CNOd</b>	0	Terminals
<b>FNOd</b>	4	LONWORKS® network
<b>F112</b>	48	Logic input R configured to "Forced switching from remote to local control" (SC/LC or CPCA)



## 7. Configuration

### 7. 4. Configuration of the LONWORKS® fault

#### ■ Configure the heartbeat

The activity on the LONWORKS® network is controlled according to the LONWORKS® configuration property Receive Heartbeat Time (nciRcvHrtBt).

nciRcvHrtBt is the time out value on the reception of 3 input network variables:

- Drive Speed Setpoint (nviDrvSpeedStpt),
- Drive Speed Setpoint Scaling (nviDrvSpeedScale),
- Frequency setpoint (nviInvSetFreq).

Refer to the description of this network variable.

#### ■ Configure the drive behaviour

- If you want to ignore LONWORKS® faults set nciRcvHrtBt to 0.
- If you want the drive to react on LONWORKS® faults set the parameter F851.

Parameter	Value	Description
<b>F851</b>	0	Communication release (no trip)
	1	Deceleration stop (no trip)
	2	Deceleration stop (no trip)
	3	Coast stop (no trip)
	4	Trip (error 8)

Communication release:

When the LONWORKS® card is installed in the ATV21 drive, the LONWORKS® card automatically catches the control.

The function SC/LC-CPCA (parameter F111/112 = 48) can modify this behaviour like described above.

If parameter F851 is set to 0, the LONWORKS® card releases the control to CMOD and FMOD.



## WARNING

If this function is not properly set up, it may cause an accident.

If you configure parameter F851 to the value 0, 1, 2, 3 or 4, the drive will not trip. It will go to the specified fault fallback behaviour.

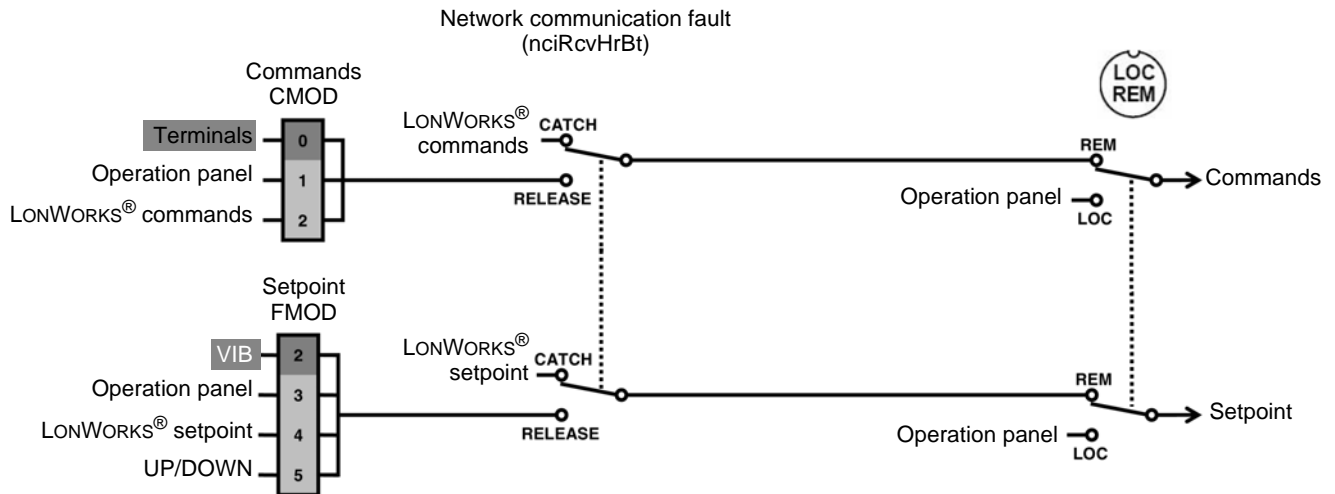
As soon as the LONWORKS® communication comes back, the drive will restart according to the LONWORKS® control.

## 7. Configuration

- Example:

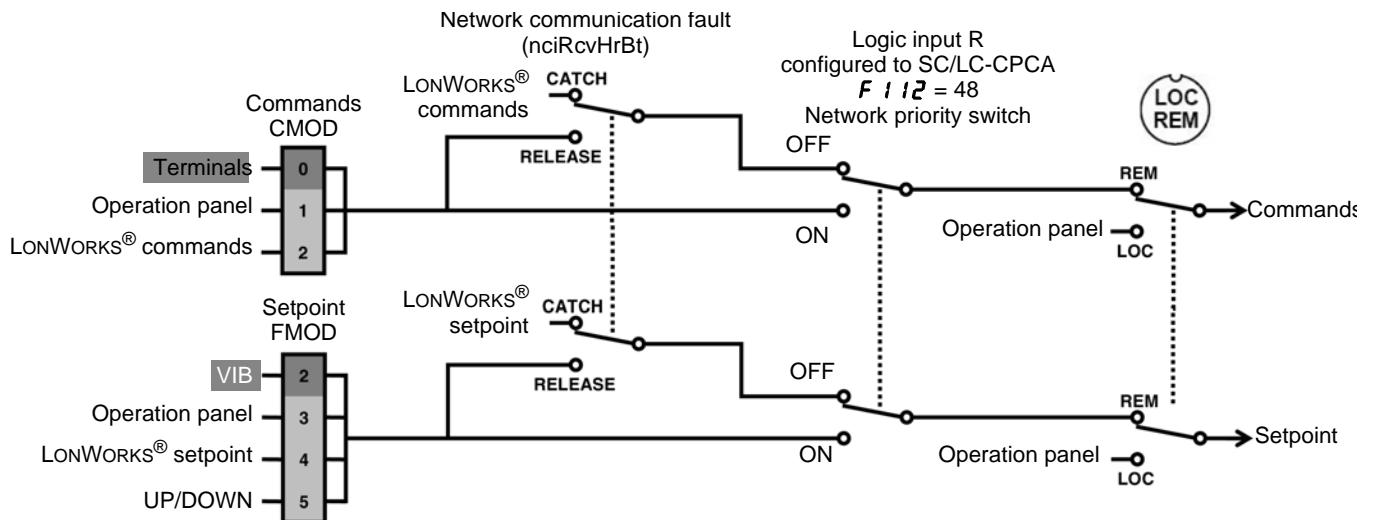
If you want the drive to switch to terminal control in case of LONWORKS® fault, configure:

Parameter	Value	Description
<b>FBS1</b>	0	Communication release (no trip)
<b>CMOD</b>	0	Terminals
<b>FMOD</b>	2	VIB



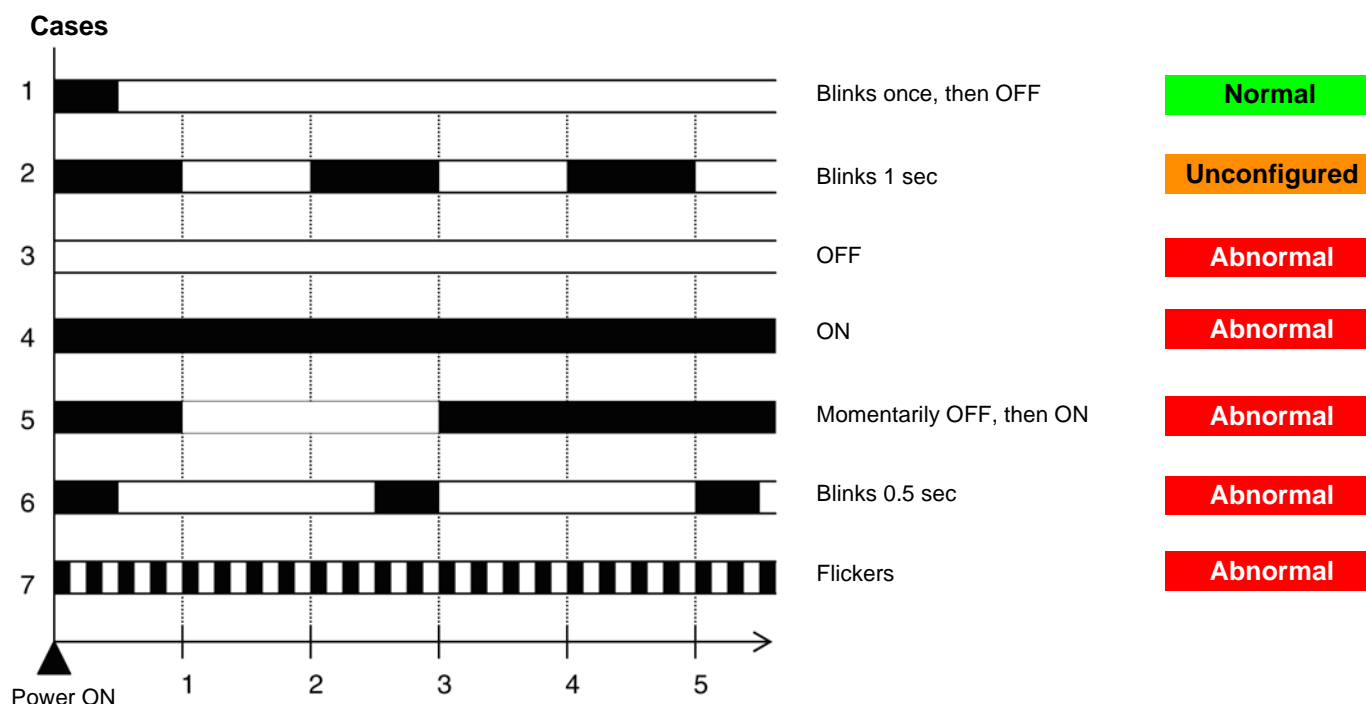
- Influence of SC/LC-CPCA

If the function SC/LC-CPCA is activated (parameter F111/112 = 48) the release function also operates.



## 8. Diagnostics

### 8. 1. Service LED



Cases	Display	Description and solutions
1	LED momentarily turns ON then continues to be OFF.	<b>Normal.</b> When the program is in the condition of "Configured" status, LED momentarily turns ON when the inverter is turned on. Then the LED continues to be OFF. The LONWORKS <sup>®</sup> neuron chip indicates "Configured" status that means the normal condition.
2	LED blinks every 1 second.	<b>Unconfigured.</b> This is a normal action of the "Unconfigured" device. Configure the LONWORKS <sup>®</sup> card through the LONWORKS <sup>®</sup> network.  If the device is not "Unconfigured", internal application program is broken. Download the application through the LONWORKS <sup>®</sup> network. If failure remains, the card needs to be replaced.
3	Although the inverter is turned on, LED remains OFF.	<b>Abnormal.</b> Check the connection between the inverter and the option card. If abnormality is not found after checking, the card needs to be replaced.
4	LED continues to be ON.	
5	LED is ON then OFF when the inverter is turned on, then it continues to be ON.	<b>Abnormal.</b> Application program of the LONWORKS <sup>®</sup> neuron chip is abnormal. Download the application through the LONWORKS <sup>®</sup> network. If failure remains, the card needs to be replaced.
6	LED blinks during 0.5 second.	<b>Abnormal.</b> A watch dog is suspected. If the same indication appears after resetting the power, the card needs to be replaced.
7	LED flickers (Approximately 10Hz to 30Hz)	<b>Abnormal.</b> The LONWORKS <sup>®</sup> neuron chip is abnormal. The card needs to be replaced.

### 8. 2. Troubleshooting

Phenomenon	Description and solutions
No reply from the LONWORKS <sup>®</sup> card	Check for proper termination resistor(s) installed on the network. After checking the service LED status, see the previous section.
Errors in network variable	Check if the RS485 communication port is used. If yes, disconnect the cable (and PC, remote keypad, Modbus network ...) from RJ45 connector. Check the inverter parameter setting. Check the network cables are not near the power cables.

## 9. Functional profile

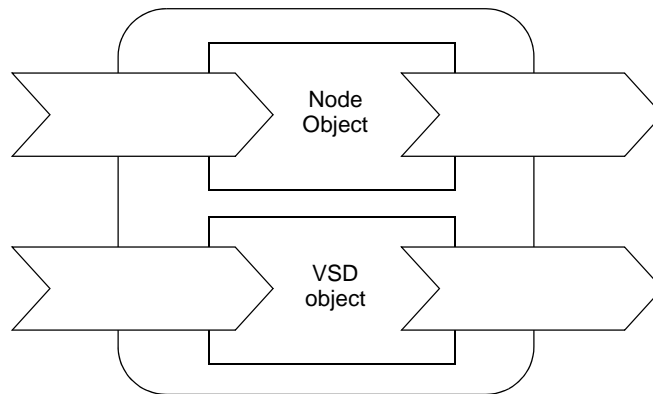
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### 9. 1. Objects supported

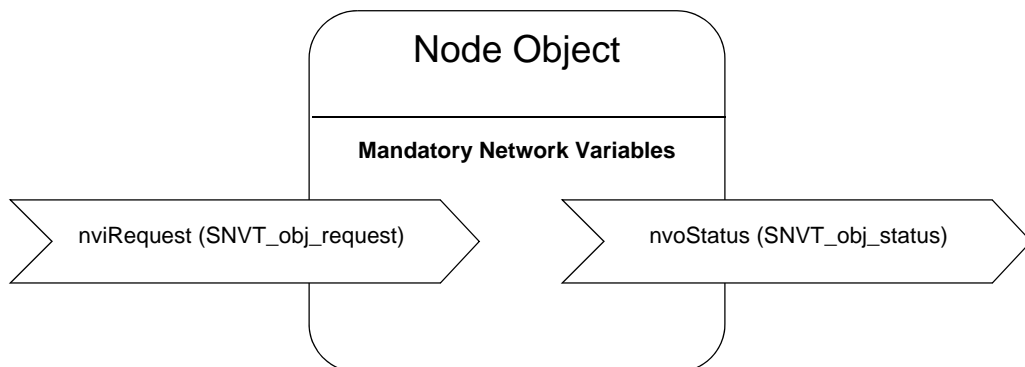
The LONWORKS® card for ATV21 complies to the LonMark functional profile variable Speed Motor Drive (specification 6010-11).

According to this profile 2 objects are supported:

- the node object (specification 0000-20),
- the variable speed motor drive object.

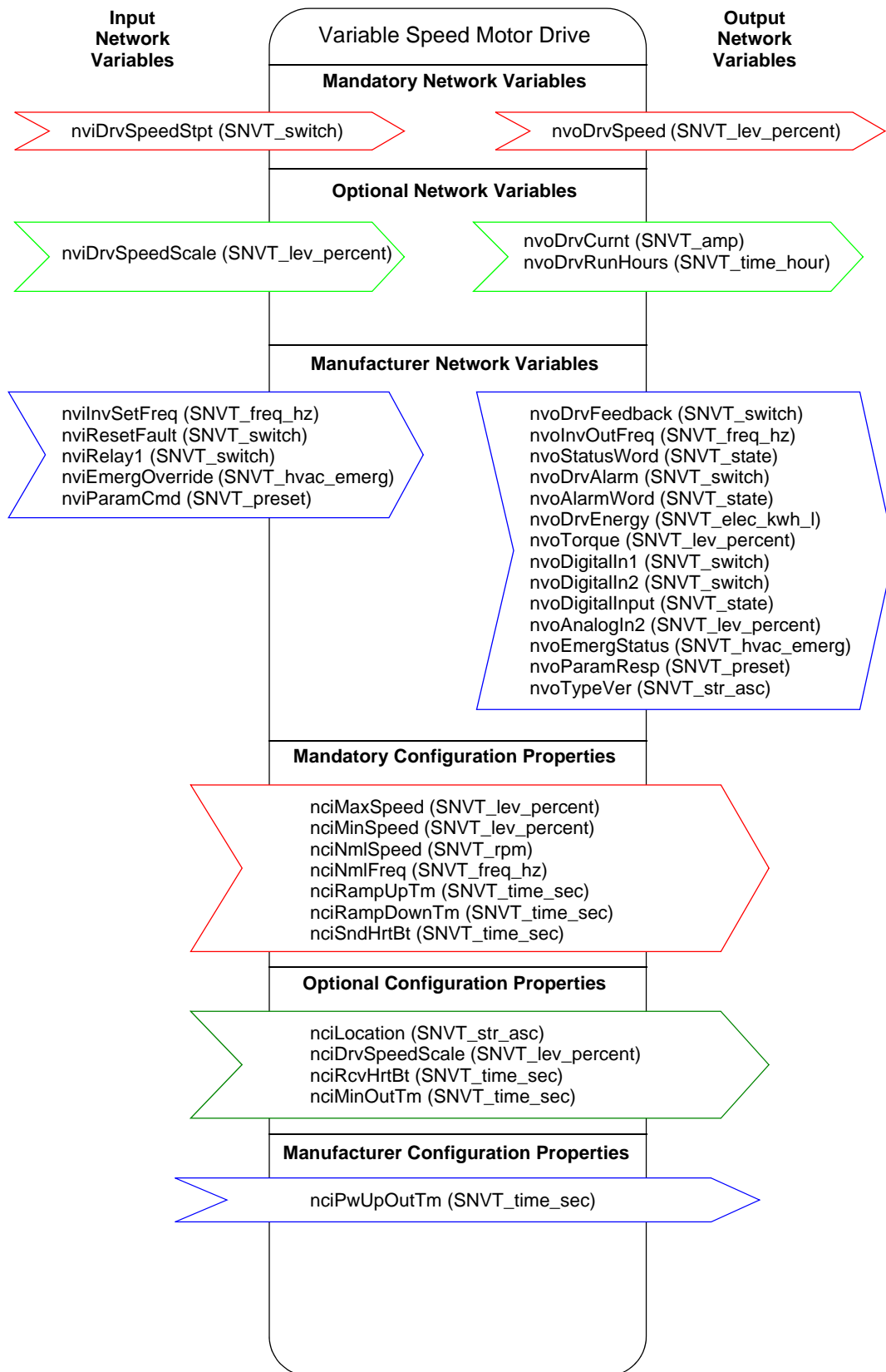


### 9. 2. LONMARK Node Object profile



## 9. Functional profile

### 9.3. LONMARK Variable Speed Motor Drive profile



## 10. Network variables and configuration properties

### 10. 1. List of network variables and configuration properties

#### Commands and setpoints

Name	SNVT	Definition	Description
nviDrvSpeedStpt	SNVT_switch	Drive Speed Setpoint	Variable Speed Motor Drive object (M)
nviDrvSpeedScale	SNVT_lev_percent	Drive Speed Setpoint Scaling	Variable Speed Motor Drive object (O)
nciDrvSpeedScale	SNVT_lev_percent	Default Value for nviDrvSpeedScale	Variable Speed Motor Drive object (O)
nviInvSetFreq	SNVT_freq_hz	Frequency setpoint	Manufacturer specific
nviResetFault	SNVT_switch	Fault reset command	Manufacturer specific
nviRequest	SNVT_obj_request	Object Request	Node object (M)

#### Status and output velocity

Name	SNVT	Definition	Description
nvoDrvSpeed	SNVT_lev_percent	Drive Speed Feedback	Variable Speed Motor Drive object (M)
nvoDrvFeedback	SNVT_switch	Drive velocity feedback	Manufacturer specific
nvoInvOutFreq	SNVT_freq_hz	Output frequency	Manufacturer specific
nvoStatusWord	SNVT_state	Drive status	Manufacturer specific
nvoStatus	SNVT_obj_status	Object Status	Node object (M)

#### Alarms

Name	SNVT	Definition	Description
nvoDrvAlarm	SNVT_switch	Alarm code	Manufacturer specific
nvoAlarmWord	SNVT_state	Alarm status	Manufacturer specific

#### Measurements

Name	SNVT	Definition	Description
nvoDrvCurnt	SNVT_amp	Drive Output Current	Variable Speed Motor Drive object (O)
nvoDrvRunHours	SNVT_time_hour	Drive Total Running Hours	Variable Speed Motor Drive object (O)
nvoDrvEnergy	SNVT_elec_kwh_l	Energy consumption	Manufacturer specific
nvoTorque	SNVT_lev_percent	Torque	Manufacturer specific

#### Monitoring of digital inputs

Name	SNVT	Definition	Description
nvoDigitalIn1	SNVT_switch	State of digital input F	Manufacturer specific
nvoDigitalIn2	SNVT_switch	State of digital input R	Manufacturer specific

#### Monitoring of analog inputs

Name	SNVT	Definition	Description
nvoAnalogIn2	SNVT_lev_percent	Value of analog input VIB	Manufacturer specific

#### Control of digital outputs

Name	SNVT	Definition	Description
nviRelay1	SNVT_switch	Command of relay FLA	Manufacturer specific

## 10. Network variables and configuration properties

### Emergency

Name	SNVT	Definition	Description
nviEmergOverride	SNVT_hvac_emerg	Emergency command	Manufacturer specific
nvoEmergStatus	SNVT_hvac_emerg	Emergency feedback	Manufacturer specific

### Adjustment

Name	SNVT	Definition	Description
nciMaxSpeed	SNVT_lev_percent	Maximum Motor Speed	Variable Speed Motor Drive object (M)
nciMinSpeed	SNVT_lev_percent	Minimum Motor Speed	Variable Speed Motor Drive object (M)
nciNmISpeed	SNVT_rpm	Nominal Motor Speed in RPM	Variable Speed Motor Drive object (M)
nciNmIFreq	SNVT_freq_hz	Nominal Motor Frequency	Variable Speed Motor Drive object (M)
nciRampUpTm	SNVT_time_sec	Minimum Ramp Up Time	Variable Speed Motor Drive object (M)
nciRampDownTm	SNVT_time_sec	Minimum Ramp Down Time	Variable Speed Motor Drive object (M)

### Parameter access

Name	SNVT	Definition	Description
nviParamCmd	SNVT_preset	Parameter access command	Manufacturer specific
nvoParamResp	SNVT_preset	Parameter access response	Manufacturer specific

### Identification

Name	SNVT	Definition	Description
nciLocation	SNVT_str_asc	Location Label	Variable Speed Motor Drive object (O)
nvoTypeVer	SNVT_str_asc	Drive identification	Manufacturer specific

### Network management

Name	SNVT	Definition	Description
nciSndHrtBt	SNVT_time_sec	Send Heartbeat Time	Variable Speed Motor Drive object (M)
nciRcvHrtBt	SNVT_time_sec	Receive Heartbeat Time	Variable Speed Motor Drive object (O)
nciMinOutTm	SNVT_time_sec	Minimum Send Time	Variable Speed Motor Drive object (O)
nciPwUpOutTm	SNVT_time_sec	Initial inhibition time	Manufacturer specific



## 10. Network variables and configuration properties

### 10.2. Commands and setpoints

#### ■ Drive Speed Setpoint (nviDrvSpeedStpt)

This input network variable provides start/stop control and velocity setpoint.

<b>Name</b>	nviDrvSpeedStpt
<b>SNVT reference</b>	SNVT_switch
<b>SNVT index</b>	95
<b>Definition</b>	Drive Speed Setpoint

Range:

State	Value	Command	Comment
0 (FALSE)	NA	Stop	The drive is stopped, the drive function is disabled and power is not applied to the motor.
0xFF	NA	AUTO (Invalid)	
1 (TRUE)	0	0%	The drive function is enabled and power may be applied to the motor.
1 (TRUE)	1 ... 200	0.5 ... 100.0%	
1 (TRUE)	201 ... 255	100.0%	

The default value (AUTO) will be adopted at power-up and in case of not receiving an update within the specified Receive Heartbeat time.

The network variable nviInvSetFreq permits the control of the drive by a frequency setpoint instead of percentage.

#### ■ Drive Speed Setpoint Scaling (nviDrvSpeedScale)

This input network variable provides scaling for nviDrvSpeedStpt.

Negative values indicate a motor direction in reverse.

For example, if the nviDrvSpeedStpt value is 50% and nviDrvSpeedScale is -150%, then the actual speed setpoint is -75%, or 0.75 times the nominal speed in the reverse direction.

<b>Name</b>	nviDrvSpeedScale
<b>SNVT reference</b>	SNVT_lev_percent
<b>SNVT index</b>	81
<b>Unit</b>	0.005%
<b>Range</b>	-163.840% ... 163.830% 0x7FFF = +163.835%: invalid value
<b>Definition</b>	Drive Speed Setpoint Scaling

Default value is determined by nciDrvSpeedScale. This value will be adopted at power-up and in case of not receiving an update within the specified Receive Heartbeat time.

#### ■ Default Value for nviDrvSpeedScale (nciDrvSpeedScale)

This configuration property is used as the default value for nviDrvSpeedScale.

When the LONWORKS® card is initialized, this network variable returns to default value (100%).

<b>Name</b>	nciDrvSpeedScale
<b>SCPT reference</b>	SCPTdefScale
<b>SCPT index</b>	162
<b>SNVT reference</b>	SNVT_lev_percent
<b>SNVT index</b>	81
<b>Unit</b>	0.005%
<b>Range</b>	-163.840% ... 163.830% 0x7FFF = +163.835%: invalid value
<b>Definition</b>	Default Value for nviDrvSpeedScale

## 10. Network variables and configuration properties

### ■ Frequency setpoint (nviInvSetFreq)

This variable is the frequency setpoint alternative to the percentage velocity setpoint (value of SNVT\_Swith nviDrvSpeedStpt).

When the setting value of nviDrvSpeedScale is negative, the motor reverse-rotates.

When this variable is invalid data (0x7FFF = 3 276.7 Hz), the drive is operated according to nciDrvSpeedStpt.

The default value is 0x7FFF = 3 276.7 Hz: invalid. It will be adopted at power-up and in case of not receiving an update within the specified Receive Heartbeat time.

<b>Name</b>	nviInvSetFreq
<b>SNVT reference</b>	SNVT_freq_hz
<b>SNVT index</b>	76
<b>Unit</b>	0.1 Hz
<b>Range</b>	0.0 ... 200.0 Hz 0x7FFF = 3276.7 Hz: invalid
<b>Definition</b>	Frequency setpoint

#### Range:

Both tables are equivalent. You may prefer the first or the second.

nviDrvSpeedStpt		nviInvSetFreq	Command
State	Value		
0	NA	NA	Stop
1	0	0x7FFF (default)	0%
	1 to 200		0.5 ... 100.0% nciNmIFreq * value * nviDrvSpeedScale
	201 to 255		100.0% nciNmIFreq * 100% * nviDrvSpeedScale
	NA	0 to 500.0Hz	Follow "nviInvSetFreq"
0xFF	NA	NA	AUTO (Invalid)

nviInvSetFreq	nviDrvSpeedStpt		Command
	State	Value	
0x7FFF (default)	0	NA	Stop
	1	0	0%
	1	1 ... 200	0.5 ... 100.0% nciNmIFreq * value * nviDrvSpeedScale
	1	201 ... 255	100.0% nciNmIFreq * 100% * nviDrvSpeedScale
	0xFF	NA	AUTO (Invalid)
0 ... 500.0Hz	0	NA	Stop
	1	NA	Follow "nviInvSetFreq"
	0xFF	NA	AUTO (Invalid)

### ■ Reset command (nviResetFault)

The reset command resets the drive when the drive is in fault state and a resettable fault has disappeared.

<b>Name</b>	nviResetFault
<b>SNVT reference</b>	SNVT_switch
<b>SNVT index</b>	95
<b>Format</b>	No / Reset; NA/100%
<b>Definition</b>	Fault reset command

#### Range:

State	Value	Command	Comment
0	any	No command	
1	any	Reset command	Value must be >0 to perform the reset command, not only state set to 1.
any other	any	Invalid (no command)	

## 10. Network variables and configuration properties

### ■ Object request (nviRequest)

This input network variable provides the mechanism to request an operation or a mode for a functional block within the drive.

<b>Name</b>	nviRequest
<b>SNVT reference</b>	SNVT_obj_request
<b>SNVT index</b>	92
<b>Definition</b>	Object request

Member name	Value		Description
object_id			Stores the object ID.
	0	RQ_NORMAL	If the specified functional block was in the disabled state, this request cancels that state, and returns the functional block to normal operation. If the functional block was already in the normal state, a request to enter the normal state is not an error. After device reset, the state of functional blocks on the device is application-specific. (Mandatory for LonMark Node Object)
	1	RQ_DISABLED	Makes the drive object invalid and brings the motor to a controlled stop. (Mandatory for LonMark Variable Speed Motor Drive profile)
	2	RQ_UPDATE_STATUS	Request the object status (nvoStatus) to be updated. (Mandatory for LonMark Node Object)
	5	RQ_REPORT_MASK	Changes to "1".bit (disabled, in_alarm, report_mask) supported by object status (nvoStatus) (Mandatory for LonMark Node Object)
	7	RQ_ENABLE	Makes the drive object valid. (Mandatory for LonMark Variable Speed Motor Drive profile)
	9	RQ_CLEAR_STATUS	Clears all bits of the object status (nvoStatus) to "0".
	10	RQ_CLEAR_ALARM	Fault reset command. Clears to "0" in _alarm bit of object status (nvoStatus). (Mandatory for LonMark Variable Speed Motor Drive profile)
	3	RQ_SELF_TEST	Not supported.
	4	RQ_UPDATE_ALARM	Not supported.
	6	RQ_OVERRIDE	Not supported.
	8	RQ_RMV_OVERRIDE	Not supported.
	11	RQ_ALARM_NOTIFY_ENAB LED	Not supported.
	12	RQ_ALARM_NOTIFY_DISABLED	Not supported.
	13	RQ_MANUAL_CTRL	Not supported.
	14	RQ_REMOTE_CTRL	Not supported.
	15	RQ_PROGRAM	Not supported.
	16	RQ_CLEAR_RESET	Not supported.
	17	RQ_RESET	Not supported.
	255	FF RQ_NUL	Nothing is done.

## 10. Network variables and configuration properties

### 10. 3. Status and output velocity

#### ■ Drive Speed Feedback (nvoDrvSpeed)

This output network variable provides the speed of the drive as a percentage of the nominal speed.

<b>Name</b>	nvoDrvSpeed
<b>SNVT reference</b>	SNVT_lev_percent
<b>SNVT index</b>	81
<b>Unit</b>	0.005%
<b>Range</b>	-163.840% to 163.830% 0x7FFF = +163.835%: invalid
<b>Definition</b>	Drive Speed Feedback

This value is transmitted immediately when its value has changed significantly. Additionally, this network variable will also be transmitted as a heartbeat output on a regular basis as specified by the Maximum Send Time (nciSndHrtBt) configuration value.

This LONWORKS® network variable is linked to the drive parameter: Operation frequency (FD00).

#### ■ Drive Velocity feedback (nvoDrvFeedback)

This variable monitors Stopped / Running status of the drive and the output velocity of as a percentage of the nominal speed of the drive (unit = 0.5%). It is the output image of nviDrvSpeedStpt.

<b>Name</b>	nvoDrvFeedback
<b>SNVT reference</b>	SNVT_switch
<b>SNVT index</b>	95
<b>Format</b>	Stopped / Running; Actual speed
<b>Unit of value</b>	0.5%
<b>Range of value</b>	0 ... 127.5%
<b>Definition</b>	Drive velocity feedback

<b>State</b>	<b>Description</b>
0 (FALSE)	Stopped
1 (TRUE)	Running

<b>Value</b>	<b>Description</b>
0... 255	0.0 ... 127.5% value = Drive Frequency / nciNmlFreq / abs (nviDrvSpeedScale)

#### ■ Output frequency (nvInvOutFreq)

This variable monitors the output velocity (0.1 Hz unit) of the drive.

<b>Name</b>	nvInvOutFreq
<b>SNVT reference</b>	SNVT_freq_hz
<b>SNVT index</b>	76
<b>Unit</b>	0.1Hz
<b>Definition</b>	Output frequency

## 10. Network variables and configuration properties

### ■ Drive status (nvoStatusWord)

This variable monitors the status of the drive by a bit field.

<b>Name</b>	nvoStatusWord
<b>SNVT reference</b>	SNVT_state
<b>SNVT index</b>	83
<b>Definition</b>	Drive status

Bit nb	Description	Link to ATV21 internal parameter
<b>0</b>	<b>Fault</b> 0 : No fault 1 : Fault	Inverter operating status (FD01) bit 1
<b>1</b>	<b>Warning</b> 0 : No warning 1 : Warning	Inverter operating status (FD01) bit 2
<b>2</b>	<b>Running</b> 0 : Stopped 1 : Running	Inverter operating status (FD01) bit 10
<b>3</b>	<b>Rotation</b> 0 : Forward 1 : Reverse	Inverter operating status (FD01) bit 9
<b>4</b>	<b>Ready</b> 0 : Not ready 1 : Ready	Inverter operating status (FD01) bit 13
<b>5</b>	<b>Command from the network</b> 0 : Not from the network 1 : From the network	Inverter operating command mode status (FE45).
<b>6</b>	<b>Setpoint from the network</b> 0 : Not from the network 1 : From the network	Inverter operating setpoint mode status (FE46) =4.
<b>7</b>	<b>At setpoint</b> 0 : Setpoint not reached (accelerating or decelerating) 1 : Setpoint reached	
<b>8</b>	Reserved	
<b>9</b>	Reserved	
<b>10</b>	Reserved	
<b>11</b>	Reserved	
<b>12</b>	Reserved	
<b>13</b>	Reserved	
<b>14</b>	Reserved	
<b>15</b>	Reserved	

## 10. Network variables and configuration properties

### ■ Object Status (nvoStatus)

This output network variable indicates various status within the drive.

<b>Name</b>	nvoStatus
<b>SNVT reference</b>	SNVT_obj_status
<b>SNVT index</b>	93
<b>Definition</b>	Object Status

Member name	Description
object_id	Returns the value written to object_id of object request (nviRequest). (Mandatory for LonMark Node Object)
invalid_id	1 means requested ID is not implemented in the drive. (Mandatory for LonMark Node Object)
invalid_request	1 means request is not implemented in the drive.
disabled	1 means object disabled. Under the disabled state, <ul style="list-style-type: none"><li>• Output network variables belonging to the functional block are not propagated to the network. However, it must be possible to poll the output network variables of a functional block in this state.</li><li>• The functional block must not respond to any updates received on its input network variables, but it must support reading and writing of any configuration properties belonging to the functional block.</li><li>• If the functional block was already in the disabled state, a request to disable the functional block is not an error.</li><li>• If the Node Object functional block is disabled, any other request to the Node Object functional block are not disabled.</li><li>• Status and alarm reporting via the "nvoStatus" outputs is not disabled when the Node Object functional block is disabled.</li></ul>
out_of_limits	Not supported.
open_circuit	Not supported.
out_of_service	Not supported.
mechanical_fault	Not supported.
feedback_failure	Not supported.
over_range	Not supported.
under_range	Not supported.
electrical_fault	Not supported.
unable_to_measure	Not supported.
comm_failure	Not supported.
fail_self_test	Not supported.
self_test_in_progress	Not supported.
locked_out	Not supported.
manual_control	Not supported.
in_alarm	1 means the drive is in fault or in alarm condition.
in_override	Not supported.
report_mask	1 means nvoStatus is an event mask. When RQ_REPORT_MASK is required by nvi_request, nvoStatus reports as "1" the supported status bit (disabled, in_alarm, report_mask). (Mandatory for LonMark Node Object)
programming_mode	Not supported.
programming_fail	Not supported.
alarm_notify_disabled	Not supported.
reset_complete	Not supported.

# 10. Network variables and configuration properties

## 10. 4. Alarms

### ■ Alarm code (nvoDrvAlarm)

This variable monitors the fault state of the drive.

<b>Name</b>	nvoDrvAlarm
<b>SNVT reference</b>	SNVT_switch
<b>SNVT index</b>	95
<b>Format</b>	Normal / Alarm; don't care

Range:

State	Value	Status
0	0	No fault
1	200 (0xC8)	Fault
-1 (0xFF)	0 ... 200	Invalid

This LONWORKS® network variable is linked to the drive parameters:

State: Operating status (FD01) bit 1.

Fault code: Alarm information monitor (FC90).

### ■ Alarm status (nvoAlarmWord)

This variable monitors the fault state of the drive by the bit 0 and additional detail by bits 1 ... 6. Bit 0 is redundant with nvoDrvAlarm.

<b>Name</b>	nvoAlarmWord
<b>SNVT reference</b>	SNVT_state
<b>SNVT index</b>	83
<b>Format</b>	16 booleans

Bit nb	Description	ATV21 mapping
0	<b>Fault</b> 0 : No fault 1 : Fault	Inverter operating status (FD01) bit 1
1	<b>Supply fault</b> (supply overvoltage, phase loss ...) 0 : No fault 1 : Fault	Trip code monitor (FC90) = 8, 30
2	<b>Drive fault</b> (overheat, power module fault, hardware, memory, internal communication, resistor ...) 0 : No fault 1 : Fault	Trip code monitor (FC90) = 13, 16, 37, 38, 39, 47, 52, 33, 34, 18, 19, 20, 21, 22, 23, 25, 26, 51, 53, 55, 56, 58
3	<b>Motor fault</b> (faults downstream of the drive: braking overvoltage, phase loss, overheating ...) 0 : No fault 1 : Fault	Trip code monitor (FC90) = 1, 2, 3, 4, 5, 6, 7, 14, 9, 10, 11, 12, 32, 84, 46, 40, 85, 86
4	<b>Process fault</b> (overload, underload ...) 0 : No fault 1 : Fault	Trip code monitor (FC90) = 29, 57
5	<b>External fault</b> (inputs, outputs, encoder, contactor, brake, ...) 0 : No fault 1 : Fault	Trip code monitor (FC90) = 15, 17, 50, 54, 36, 43, 44
6	<b>Communication fault</b> 0 : No fault 1 : Fault	Trip code monitor (FC90) = 24, 27
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Reserved	
12	Reserved	
13	Reserved	
14	Reserved	
15	Reserved	

## 10. Network variables and configuration properties

### 10. 5. Measurements

#### ■ Drive Output Current (nvoDrvCurnt)

This output network variable provides the drive output current (0,1 A).

<b>Name</b>	nvoDrvCurnt
<b>SNVT reference</b>	SNVT_amp
<b>SNVT index</b>	1
<b>Unit</b>	0.1 A
<b>Range</b>	0 ... 3 276.6 0x7FFF = +3 276.7: invalid
<b>Definition</b>	Drive Output Current

This value is transmitted immediately when its value has changed significantly. Additionally, this network variable will also be transmitted as a heartbeat output on a regular basis as specified by the Maximum Send Time (nciSndHrtBt) configuration value.

This value will be updated no faster than the Minimum Send Time (nciMinOutTm).

#### ■ Drive Total Running Hours (nvoDrvRunHours)

This output network variable provides the total operation time for the motor in running hours.

<b>Name</b>	nvoDrvPwr
<b>SNVT reference</b>	SNVT_time_hour
<b>SNVT index</b>	124
<b>Unit</b>	1 h
<b>Range</b>	0 ... 65 534 h 0xFFFF = 65 535 h: invalid
<b>Definition</b>	Drive Total Running Hours

This value is transmitted immediately when its value has changed.

#### ■ Energy consumption (nvoDrvEnergy)

This variable monitors the energy cumulative consumption of the drive.

<b>Name</b>	nvoDrvEnergy
<b>SNVT reference</b>	SNVT_elec_kwh_l
<b>SNVT index</b>	146
<b>Unit</b>	0.1 kWh
<b>Range</b>	0 ... 214 748 364.6 kWh
<b>Definition</b>	Energy consumption

If an overflow occurred, the value returns to 0.

#### ■ Torque actual value (nvoTorque)

This variable monitors the motor torque.

The unit is 0.005% of "Nominal motor torque". The "Nominal motor torque" is not accessible as a drive parameter. It is the result of the other characteristics.

<b>Name</b>	nvoTorque
<b>SNVT reference</b>	SNVT_lev_percent
<b>SNVT index</b>	81
<b>Unit</b>	0.005% of Nominal motor torque
<b>Range</b>	0% ... 163.830%

This LONWORKS® network variable is linked to the drive parameter: Output torque (FE18)



## 10. Network variables and configuration properties

### 10. 6. Monitoring of digital inputs

#### ■ Monitoring of digital input F (nvoDigitalIn1)

This variable monitors the value of digital input F.

Name	nvoDigitalIn1
SNVT reference	SNVT_switch
SNVT index	95
Definition	Value of the digital input F

This LONWORKS® network variable is linked to the drive parameter: Value of input F, Input terminal information (FD06).

#### ■ Monitoring of digital input R (nvoDigitalIn2)

This variable monitors the value of digital input R.

Name	nvoDigitalIn2
SNVT reference	SNVT_switch
SNVT index	95
Definition	Value of the digital input R

This LONWORKS® network variable is linked to the drive parameter: Value of input R, Input terminal information (FD06).

### 10. 7. Monitoring of analog inputs

#### ■ Monitoring of analog input VIB (nvoAnalogIn2)

This variable monitors the analog input VIB (%).

Name	nvoAnalogIn2
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	0% ... 163 830%
Definition	Value of the analog input VIB

This LONWORKS® network variable is linked to the drive parameter: Analog input value VIB monitor (FE36).

The adjustment of analogue input is possible by setting the parameters **F 4 7 2** and **F 4 7 3** (refer to ATV21 user manual).

### 10. 8. Control of digital outputs

#### ■ Control of relay FL (nviRelay1)

This variable enables the command of relay FL of the drive if it is not assigned (parameter **F 1 3 2** = 38).

Name	nviRelay1
SNVT reference	SNVT_switch
SNVT index	95
Definition	Command of relay FL

This LONWORKS® network variable is linked to the drive parameter: Relay FL, Terminal Output Data (FA50) bit 0.

# 10. Network variables and configuration properties

## 10. 9. Emergency

### ■ Emergency command (nviEmergOverride)

This variable produces an emergency stop of the drive.  
The emergency state disappears after the trip has been released by nviEmergOverride with value 0.  
Then it is possible to reset the drive by nviResetFault or a local command.

<b>Name</b>	nviEmergOverride
<b>SNVT reference</b>	SNVT_hvac_emerg
<b>SNVT index</b>	103

Value	Action	Comment
0	Drive trip release	EMERG_NORMAL (No Emergency mode)
1	Emergency stop	EMERG_PRESSURIZE (Emergency pressurize mode)
2		EMERG_DEPRESSURIZE (Emergency depressurize mode)
3		EMERG_PURGE (Emergency purge mode)
4		EMERG_SHUTDOWN (Emergency shutdown mode)
5		EMERG_FIRE
6 ... 0xFF		...

Emergency stop can be configured by Emergency stop selection parameter (F603) to coast stop, slowdown stop or emergency DC braking.

### ■ Emergency status (nvoEmergStatus)

This variable monitors the emergency status of the drive. It provides the response against an emergency stop of the inverter (nviEmergOverride). When the node received "nviEmergOverride", it propagates the information to the network.

<b>Name</b>	nvoEmergStatus
<b>SNVT reference</b>	SNVT_hvac_emerg
<b>SNVT index</b>	103

Value	Action	Comment
0	No emergency stop	EMERG_NORMAL (No Emergency mode)
1	Emergency stop	EMERG_PRESSURIZE (Emergency pressurize mode)
2		EMERG_DEPRESSURIZE (Emergency depressurize mode)
3		EMERG_PURGE (Emergency purge mode)
4		EMERG_SHUTDOWN (Emergency shutdown mode)
5		EMERG_FIRE
6 ... 0xFF		...

## 10. Network variables and configuration properties

### 10. 10. Adjustment

#### ■ Maximum Motor Speed (nciMaxSpeed)

This configuration property is used to define the maximum speed of the motor.

The value is entered as a percent of nominal frequency, as defined by the Nominal Motor Frequency (nciNmlFreq) configuration value. The value of the maximum speed must be validated against the value of the minimum speed as follows:

$0 \leq \text{minimum speed} \leq \text{maximum speed} \leq 163\,830$

Name	nciMaxSpeed
SCPT reference	SCPTmaxSetpoint
SCPT index	50
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	0% ... 163 830% 163 835% = 32 767 = 0x7FFF: invalid
Default value	100 000%
Definition	Maximum Motor Speed

This LONWORKS® configuration property is linked to the drive parameter: Upper limit frequency **UL**. nci Max speed is also subject to the UL limitations.

By editing nciMaxSpeed, the LONWORKS® card changes the frequency upper limit UL, automatically.

### ⚠ DANGER

Do not set the value out of valid range.

Otherwise, It may result in injuries by motor running with unexpected speed.

#### ■ Minimum Motor Speed (nciMinSpeed)

This configuration property is used to define the minimum speed of the motor.

The value is entered as a percent of nominal speed in RPM, as defined by the Nominal Speed (nciNmlSpeed) configuration value. The value of the minimum speed must be validated against the value of the maximum speed as follows:

$-163\,840 \leq \text{minimum speed} \leq \text{maximum speed} \leq 163\,830$

Name	nciMinSpeed
SCPT reference	SCPTminSetpoint
SCPT index	53
SNVT reference	SNVT_lev_percent
SNVT index	81
Unit	0.005%
Range	-163 840% ... 163 830% 163 835% = 32 767 = 0x7FFF: invalid
Default value	0.000%
Definition	Minimum Motor Speed

This LONWORKS® configuration property is linked to the drive parameter: Lower limit frequency **LL**.

By editing this variable, the LONWORKS® card changes the frequency lower limit LL automatically.

### ⚠ DANGER

Do not set the value out of valid range.

Otherwise, It may result in injuries by motor running with unexpected speed.

## 10. Network variables and configuration properties

### ■ Nominal Motor Speed in RPM (nciNmISpeed)

This configuration property is used to provide the nominal speed of the motor in RPM. This value is necessary to determine the minimum and maximum speed for the motor, based on the configuration properties nciMinSpeed, nciMaxSpeed (entered as percent of nominal speed).

Name	nciNmISpeed
SCPT reference	SCPTnomRPM
SCPT index	158
SNVT reference	SNVT_rpm
SNVT index	102
Unit	rpm
Range	0 ... 65 535 rpm
Definition	Nominal Motor Speed in RPM

### DANGER

Do not change this value while the motor is running. Otherwise, It may result in injuries by motor running with unexpected speed.

Do not set the value out of valid range. Otherwise, It may result in injuries by motor running with unexpected speed.

### ■ Nominal Motor Frequency (nciNmIFreq)

This configuration property is used to provide the nominal frequency of the motor. It should be set to the rated frequency of the motor.

Name	nciNmIFreq
SCPT reference	SCPTnomFreq
SCPT index	159
SNVT reference	SNVT_freq_hz
SNVT index	76
Unit	0.1 Hz
Range	25.0 ... 200.0 Hz
Definition	Nominal Motor Frequency

### DANGER

Do not change this value while the motor is running. Otherwise, It may result in injuries by motor running with unexpected speed.

Do not set the value out of valid range. Otherwise, It may result in injuries by motor running with unexpected speed.

## 10. Network variables and configuration properties

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### ■ Minimum Ramp Up Time (nciRampUpTm)

This configuration property determines the ramp up time of the motor.

<b>Name</b>	nciRampUpTm
<b>SCPT reference</b>	SCPTrampUpTm
<b>SCPT index</b>	160
<b>SNVT reference</b>	SNVT_time_sec
<b>SNVT index</b>	107
<b>Unit</b>	0.1 sec
<b>Range</b>	0.1 ... 3200.0 sec
<b>Definition</b>	Minimum Ramp Up Time

This LONWORKS® configuration property is linked to the drive parameter: Acceleration time 1 **ACC**.

### ■ Minimum Ramp Down Time (nciRampDownTm)

This configuration property determines the ramp down time of the motor.

<b>Name</b>	nciRampDownTm
<b>SCPT reference</b>	SCPTrampUpTm
<b>SCPT index</b>	160
<b>SNVT reference</b>	SNVT_time_sec
<b>SNVT index</b>	107
<b>Unit</b>	0.1 sec
<b>Range</b>	0.1 ... 3200.0 sec
<b>Definition</b>	Minimum Ramp Down Time

This LONWORKS® configuration property is linked to the drive parameter: Deceleration time 1 **DEC**.

## 10. Network variables and configuration properties

### 10. 11. Parameter access

#### ■ nviParamCmd, nvoParamResp

A controller node can monitor or modify any drive parameter by supporting the Parameter access command and the Parameter access response functions. These functions allow a controller complete access to the features of the drive and the ability to configure drives with predefined settings, using the network variables nviParamCmd and nvoParamResp.

<b>Name</b>	nviParamCmd
<b>SNVT reference</b>	SNVT_preset
<b>SNVT index</b>	94
<b>Format</b>	Structure, 14 bytes
<b>Definition</b>	Parameter access command

<b>Name</b>	nvoParamResp
<b>SNVT reference</b>	SNVT_preset
<b>SNVT index</b>	94
<b>Format</b>	Structure, 14 bytes
<b>Definition</b>	Parameter access response

The following definitions describe how the fields of SNVT\_preset are used by the LONWORKS® card of the drive:

#### Learn

This field contains the function code for the ATV21. The values for this field are:

Value	Element	Action
3	LN_REPORT_VALUE	Read command
2	LN_LEARN_VALUE	Write command (to the EEPROM)

Any other value in this field will result in an error message in the Parameter access response.

#### Selector

This field contains the drive parameter communication number, written in decimal notation, that is to be written or read. Requests for undefined parameters will result in an error message in the Parameter access response.

The controlling device should compare the parameter address of the response message to the requested parameter address to determine that the information received is the requested information and not a response to another controller or from another drive.

The drive parameters are described in the Altivar 21 User manual and Modbus User manual, with their logic address and possible values.

#### Value

This array contains the parameter information to and from the drive. All drive parameters use INT or UINT (16 bit words signed or unsigned). The most significant byte of data will be stored in value [2] and the least significant byte of data will be stored in value [3]. In the event of an error message, the drive will send 0xFF in value [0] and an error code in value [3].

#### Error codes

Code	Meaning
1	Illegal function for the addressed node
2	Illegal parameter address
3	Illegal data value
4	Illegal access (writing prohibited)

#### Day, Hour, Minute, Second, Millisecond

The time fields are not supported by the LONWORKS® card. The drive will respond to parameter access requests as soon as they are received. Any values in the time fields of the Parameter access command will be ignored. All time fields will be set to "0" in the Parameter access response.

## 10. Network variables and configuration properties

### ■ Example 1: Read access

A controller node reads the value of Trip code (address FC90). Now, **OL 1** trip (trip code is 13 decimal) occurs. The value is 000D hex. The controller node sends/receives the following data.

Field	Send (nviParamCmd)	Receive (nviParamResp)
learn	LN_REPORT_VALUE	LN_REPORT_VALUE
selector	FC90 hex	FC90 hex
value[0]	N/A	00 hex
value[1]	N/A	00 hex
value[2]	N/A	00 hex
value[3]	N/A	0D hex
day ,hour, minute, second, millisecond	N/A	0

### ■ Example 2: Write access

The controller node writes cumulative energy clear command (address FA20). The data value is 0002 hex. The controller node sends/receives the following data.

Field	Send (nviParamCmd)	Receive (nviParamResp)
learn	LN_REPORT_VALUE	LN_REPORT_VALUE
selector	FA20 hex	FA20 hex
value[0]	00 hex	00 hex
value[1]	00 hex	00 hex
value[2]	00 hex	00 hex
value[3]	02 hex	02 hex
day ,hour, minute, second, millisecond	N/A	0

Note: After sending cumulative energy clear command, 0000 hex should be re-written into FA20.

### ■ Example 3: Illegal access

Illegal data is written to the inverter parameter **F 1 1 1**, (Base frequency voltage, address 0171). The upper limit value is 330.0V (200V class). In case of writing 360.0V, the unit of this parameter is 0.1V and the data value is converted to hex, so the value is 0E10 hex. The controller node sends/receives the following data (out of range error).

Field	Send (nviParamCmd)	Receive (nviParamResp)
learn	LN_REPORT_VALUE	LN_REPORT_VALUE
selector	0171 hex	0171 hex
value[0]	00 hex	FF hex
value[1]	00 hex	00 hex
value[2]	0E hex	00 hex
value[3]	10 hex	03 hex
day ,hour, minute, second, millisecond	N/A	0

## 10. Network variables and configuration properties

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### 10. 12. Identification

#### ■ Location Label (nciLocation)

This configuration property can be used to provide more descriptive physical location information than can be provided by the Neuron Chip's 6 byte location string. The string may be loaded from the LONWORKS<sup>®</sup> network.

<b>Name</b>	nciLocation
<b>SCPT reference</b>	SCPTLocation
<b>SCPT index</b>	17
<b>SNVT reference</b>	SNVT_str_asc
<b>SNVT index</b>	36
<b>Range</b>	Any NULL terminated ASCII string of 31 bytes total length (30 bytes are available because 31 <sup>th</sup> byte is a NULL)
<b>Default value</b>	The default value is an ASCII string containing all zeros ("0").
<b>Definition</b>	Location Label

#### ■ Identification (nvoTypeVer)

This variable provides identification data from the drive (Brand, commercial reference, version).

<b>Name</b>	nvoTypeVer
<b>SNVT reference</b>	SNVT_str_asc
<b>SNVT index</b>	36
<b>Format</b>	ASCII string (ended by NULL terminator)
<b>Definition</b>	Identification of the drive

The string is composed of:

Brand, space, commercial reference, space, "V", major revision (1 character), ".", minor revision (maximum 2 characters)

Examples:

Telemecca ATV21H075N4 V1.06



# 10. Network variables and configuration properties

## 10. 13. Network management

### ■ Send Heartbeat Time (nciSndHrtBt)

This configuration property defines the maximum period of time that expires before automatic update of the network variables:

- nvoDrvSpeed,
- nvoDrvCurnt,
- nvoDrvRunHours,
- nvoStatusWord,
- nvoDrvFeedback,
- nvoInvOutFreq,
- nvoDrvAlarm,
- nvoTorque,
- nvoDrvEnergy,
- nvoDigitalIn1,
- nvoDigitalIn2,
- nvoAnalogIn2.

<b>Name</b>	nciSndHrtBt
<b>SCPT reference</b>	SCPTmaxSendTime
<b>SCPT index</b>	49
<b>SNVT reference</b>	SNVT_time_sec
<b>SNVT index</b>	107
<b>Unit</b>	0.1 sec
<b>Range</b>	0.0 ... 6 553.4 sec
<b>Default value</b>	0 (no automatic update)
<b>Definition</b>	Send Heartbeat Time

### ■ Receive Heartbeat Time (nciRcvHrtBt)

This configuration property is used to control the maximum time that elapses after the last update of at least one of the network variables:

- Drive Speed Setpoint (nviDrvSpeedStpt),
- Drive Speed Setpoint Scaling (nviDrvSpeedScale),
- Frequency setpoint (nviInvSetFreq).

When these variables are not updated within the heartbeat time the LONWORKS® card will detect a communication fault and nviDrvSpeed, nviDrvSpeedScale and nviInvSetFreq will return to their initial value.

It is possible to configure the behaviour of the drive in case of LONWORKS® communication fault, please refer to "7. 4." Configuration of the LONWORKS® fault", page 18.

<b>Name</b>	nciRcvHrtBt
<b>SCPT reference</b>	SCPTmaxRcvTime
<b>SCPT index</b>	48
<b>SNVT reference</b>	SNVT_time_sec
<b>SNVT index</b>	107
<b>Unit</b>	0.1 sec
<b>Range</b>	0.1 ... 6 553.4 sec 0.0 (no failure detection)
<b>Default value</b>	0.0 (no failure detection)
<b>Definition</b>	Receive Heartbeat Time

## 10. Network variables and configuration properties

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### ■ Minimum Send Time (nciMinOutTm)

This configuration property defines the minimum period of time between automatic network variable transmissions. This function is active prior to "nciSndHrtBt".

<b>Name</b>	nciMinOutTm
<b>SCPT reference</b>	SCPTminSendTime
<b>SCPT index</b>	52
<b>SNVT reference</b>	SNVT_time_sec
<b>SNVT index</b>	107
<b>Unit</b>	0.1 sec
<b>Range</b>	0.0 ... 6 553.4 sec
<b>0.0 disables transmission</b>	
<b>Default value</b>	0.5 sec
<b>Definition</b>	Minimum Send Time

### ■ Power supply start waiting time (nciPwUpOutTm)

Waiting time until the drive starts transmission after reset or power on.

When a setting value is 0, transmission will start after the initialization of the LONWORKS® card is finished.

This configuration property freezes the transmission of the network variables concerned by nciSndHrtBt:

- nvoDrvSpeed,
- nvoDrvCurnt,
- nvoDrvRunHours,
- nvoStatusWord,
- nvoDrvFeedback,
- nvoInvOutFreq,
- nvoDrvAlarm,
- nvoTorque,
- nvoDrvEnergy,
- nvoDigitalIn1,
- nvoDigitalIn2,
- nvoAnalogIn2.

<b>Name</b>	nciPwUpOutTm
<b>SCPT reference</b>	SCPTpwrUpDelay
<b>SCPT index</b>	72
<b>SNVT reference</b>	SNVT_time_sec
<b>SNVT index</b>	107
<b>Unit</b>	0.1 sec
<b>Range</b>	0.0 ... 6 553.4 sec Values 300.0 ... 6 553.4 are limited to 300.0 sec 0.0: Transmission starts immediately after initialisation of the LONWORKS® card is finished.
<b>Default value</b>	0.0 sec
<b>Definition</b>	Power supply start waiting time

